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10/725,433	12/03/2003	Heung-Yeop Jang	Q77246	5326

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EXAMINER

COLUCCI, MICHAEL C

ART UNIT	PAPER NUMBER
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2609

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/725,433

Applicant(s)

JANG ET AL.

Examiner

Michael C. Colucci

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/11/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 5, 6, 7, 8, 11, 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean et al 6,253,185 B1 in view of Suzuki et al 5,654,952.

Re claim 1, Arean discloses an audio data encoding apparatus (Fig. 8) comprising:

a time-to-frequency converting unit that receives a time domain audio signal and converts the time domain audio signal to a frequency domain audio signal (*Arean et al discloses an analysis filter bank that converts input audio signal data from the time-domain to the frequency-domain, Col. 11 line 59-61 and Fig. 8*)

a spectral processor that receives the frequency domain audio signal and performs spectral processing on the frequency domain signal according to an audio encoding format (*Arean et al discloses a method for processing audio signals where information from a complete frequency spectrum is obtained, Col. 17 line 45-59*)

a masking threshold calculator that receives the frequency domain audio signal, calculates an energy level for each frequency band of the frequency domain audio signal, approximates an energy distribution curve connecting the calculated energy levels to a distribution pattern of noise threshold levels calculated by a psychoacoustic

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model, and calculates a scalefactor band gain for each frequency band (*Arean et al disclose the computation of a masking threshold within the frequency domain, Col. 12 line 4-7. Arean et al also discloses the separation of data into bands, known as gain factor bands, where a corresponding threshold value is computed within each band, Col. 12 line 9-14*).

a quantization noise curve adjuster that adjusts a common gain to meet a target bit rate and matches a quantization noise curve to the approximated energy distribution curve while fixing the scalefactor gain for each frequency band (*Arean et al discloses a quantization process to reduce noise within the frequency domain while stile satisfying the target bit rate requirement, Col. 12 line 19-33*)

However Arean et al fails to disclose characteristics or a model in relation to psychoacoustics. Arean et al also neglects to disclose energy levels within the signal.

Suzuki discloses the separation of a main signal into critical bands or frequency bands that take into account psychoacoustic characteristics of the human hearing mechanism (Suzuki et al - Col. 7 line 18-21). Suzuki et al further discloses the signal energy or peak values present within an audio signal's divided bands (Suzuki et al – Col. 16 line 49-60).

Therefore, the combined teaching of Arean et al and Suzuki et al would have rendered obvious a masking threshold computation within the frequency domain that realizes the energy of a signal in reference to noise in view of psychoacoustic characteristics.

Re claim 2, which further recites “wherein the time-to-frequency converting unit performs Modified Discrete Cosine Transform (MDCT) on the input time domain signal”. Areal discloses the use of the Modified Discrete Cosine Transform (MDCT) during the conversion from the time domain to the frequency domain (*Col. 11 line 61-65*).

Re claim 4, which further recites “wherein the masking threshold calculator comprises: an energy distribution curve calculator that performs Modified Discrete Cosine Transform (MDCT) on the frequency domain audio signal to calculate the energy level for each frequency band” (*in Areal, by extracting the frequency spectrum of a signal, the energy can be calculated through Fourier analysis by one skilled in the art, see analysis for claim 2*);

“a quantization noise curve pattern estimator that adjusts quantization noise distribution by relatively adjusting a gain for each frequency band based on the calculated energy distribution curve” (*in Areal, a bit adjustment initial value setter that determines the scalefactor band gain in such a way as to use more bits than the target bit rate*).

Re claim 5, which further recites “wherein the quantization noise curve adjuster compares the number of bits available for a given bit rate with the number of bits used, and if the number of bits used is smaller than the number of bits available, performs encoding using the number of bits available, or, if the number of bits used is not smaller than the number of bits available, repeats matching of the quantization noise curve”. Areal refers to threshold values from a perceptual model 106 being supplied as inputs to a 107 model that quantizes coefficients. Within this 107 model, Areal et al

discloses a quantization process where quantization step sizes are adjusted according to the computed perceptual threshold values in order to meet the noise level requirements in reference to a target bit rate for the signal. In order to adjust gain and quantization levels bits must be compared to a quantization model or curve. A set of data can be plotted to form a curve, therefore a curve can be representative of a set of quantized values in the form of bits set aside for comparison. Therefore, the combined teaching of Arean et al and Suzuki et al would have rendered obvious the utilization of quantization parameters for the comparison of binary data (bits) for the purpose of encoding (Arean, Col. 12 line 13-34).

Claim 6 has been analyzed and rejected with respect to claim 1. Claim 6 is disclosed within claim 1.

Claim 7 has been analyze and rejected with respect to claim 1. Claim 7 discloses the method of the apparatus of claim 1.

Claim 8 has been analyzed and rejected with respect to claim 4. Claim 8 discloses the method of the apparatus of claim 4.

Claim 11 has been analyzed and rejected with respect to claim 7.

Claim 12 has been analyzed and rejected with respect to claim 7. Claim 12 discloses the product by process of the method of claim 7.

Claim 13 has been analyzed and rejected with respect to claim 11. Claim 13 discloses the product by process of the method of claim 11.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Areal et al and Suzuki et al as applied to claim 1 above and further in view of Araki 6,456,963.

Re claim 3, which further recites “wherein the spectral processor performs Temporal Noise Shaping (TNS), Long Term Prediction (LTP), or Perceptual Noise Substitution (PNS) according to an audio encoding format”. The combined teaching of Areal et al and Suzuki et al as a whole fails to disclose spectral processing in relation to Temporal Noise Shaping (TNS), Long Term Prediction (LTP), or Perceptual Noise Substitution (PNS). However, the claim language within claim 3 only discloses the selection of one of three choices for spectral analysis. When read in light of the specification, no disclosure of when one form of spectral processing should be used over the other exists.

Araki discloses the use of temporal noise shaping of an audio signal (col. 2 line 26-35).

Therefore, the combined teaching of Areal et al, Suzuki et al, and Araki as a whole would have rendered obvious processing by use of Temporal Noise Shaping (TNS)) for audio enhancement.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Areal et al and Suzuki et al as applied to claim 8 above and further in view of Akagiri et al 5,241,603.

Re claim 9, which further recites “wherein in the step (c2), if a signal in one of adjacent frequency bands has an energy level greater than that of a signal in a particular frequency band, the energy level of the signal in the particular band is increased by a predetermined ratio with respect to a difference with the greater energy level in the adjacent frequency band”. Though the combined teaching of Arean et al and Suzuki et al makes obvious gain adjustment within frequency bands, it fails to disclose how they both fail to disclose how adjacent frequency bands relate to one another and the energy level adjustments within the bands.

Akagiri et al discloses a means for setting an allowable noise level based on the energies of signals temporally adjacent to the signals of the frequency band under consideration for quantization. Akagiri et al also disclose quantizing signals per frequency band corresponding to a difference in energy levels of the frequency bands (col. 2 line 31-49).

Therefore, the combined teaching of Arean et al, Suzuki et al, and Akagiri et al would have rendered obvious the adjustment of energy levels with respect to a difference in adjacent frequency bands of a signal to allow noise adjustment.

5. Claim 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean et al and Suzuki et al as applied to claim 8 above and further in view of Jayant et al 5,559,900.

Re claim 10, which further recites “wherein in the step (c3), a signal having a largest energy level is found among signals in all frequency bands, a gain for each frequency band is determined according to a difference between the largest energy

level and an energy level of a signal in each frequency band, and quantization noise distribution for each frequency band is approximated in the form of a noise threshold".

The combined teaching of Areal et al and Suzuki et al as a whole makes obvious quantization as a means for realizing noise from the frequency spectrum. However, both fail to disclose the threshold of noise within a frequency band as well as the further limitation of the use of quantization.

Jayant et al disclose the encoding of frequency bands in reference to a "just noticeable difference" noise spectrum. This is construed as a noise threshold. Jayant et al disclose bands with the greatest energy relative to the "just noticeable spectrum" energy in the band (Abstract, col. 3, line 63 – col. 4, line 6).

Therefore, the combined teaching of Areal et al, Suzuki et al, and Jayant et al would have rendered obvious the signal level adjustment relative to the difference of the largest energy and the signal energy within a frequency band referring to a noise spectrum in order to make decision whether to transmit those frequency bands (Jayant, col. 2, lines 59-64).

Examiner's Note

The referenced citations made in the rejection(s) above are intended to exemplify areas in the prior art document(s) in which the examiner believed are the most relevant to the claimed subject matter. However, it is incumbent upon the applicant to analyze the prior art document(s) in its/their entirety since other areas of the document(s) may be relied upon at a later time to substantiate examiner's rationale of record. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead

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away from the claimed invention. W.L. Gore & associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

However, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

CONTACT

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)270-1847. The examiner can normally be reached on 7:30 am - 5:00 pm , alt. Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vu Le can be reached on (571)-272-7332. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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